

68467-21

11/14/2013

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 <p>U.S. ENVIRONMENTAL PROTECTION AGENCY Office of Pesticide Programs Biopesticides and Pollution Prevention Division (7511P) Ariel Rios Building 1200 Pennsylvania Ave., NW Washington, D.C. 20460</p> <p>NOTICE OF PESTICIDE: <input checked="" type="checkbox"/> Registration <input type="checkbox"/> Reregistration (under FIFRA, as amended)</p>	EPA Reg. Number: 68467-21	Date of Issuance: NOV 14 2013
	Term of Issuance: Unconditional	
Name and Address of Registrant (include ZIP Code): Mycogen Seeds c/o Dow AgroSciences LLC 9330 Zionsville Road Indianapolis, IN 46268		
Note: Changes in labeling differing in substance from that accepted in connection with this registration must be submitted to and accepted by the Biopesticides and Pollution Prevention Division prior to use of the label in commerce. In any correspondence on this product always refer to the above EPA registration number.		
<p>On the basis of information furnished by the registrant, the above named pesticide is hereby registered/reregistered under the Federal Insecticide, Fungicide and Rodenticide Act. Registration is in no way to be construed as an endorsement or recommendation of this product by the Agency. In order to protect health and the environment, the Administrator, on his motion, may at any time suspend or cancel the registration of a pesticide in accordance with the Act. The acceptance of any name in connection with the registration of a product under this Act is not to be construed as giving the registrant a right to exclusive use of the name or to its use if it has been covered by others.</p> <p>This registration does not eliminate the need for continual reassessment of the pesticide. If EPA determines at any time, that additional data are required to maintain in effect an existing registration, the Agency will require submission of such data under section 3(c)(2)(B) of FIFRA.</p>		
<p>This product is unconditionally registered in accordance with FIFRA § 3(c)(5) provided that you comply with the following terms and conditions:</p> <ol style="list-style-type: none"> 1) Submit/cite all data required for registration of your product under FIFRA § 3(c)(5) when the Agency requires registrants of similar products to submit such data. 2) The subject registration will automatically expire at midnight on November 30, 2015. 		
Signature of Approving Official:  Robert McNally, Director Biopesticides and Pollution Prevention Division (7511P)	Date: 11/14/13	

3) The subject registration is limited to a field corn seed blend of up to 95% Cry1A.105 [*Bacillus thuringiensis* Cry1A.105 protein and the genetic material (vector PV-ZMIR245) necessary for its production in corn event MON 89034 (OECD Unique Identifier MON-89034-3)] x Cry2Ab2 [*Bacillus thuringiensis* Cry2Ab2 protein and the genetic material (vector PV-ZMIR245) necessary for its production in corn event MON 89034 (OECD Unique Identifier MON-89034-3)] x Cry1F [*Bacillus thuringiensis* Cry1F protein and the genetic material (plasmid insert PHP8999) necessary for its production in corn event TC1507 (OECD Unique Identifier DAS-Ø15Ø7-1)] field corn seed and a minimum of 5% non-*Bt* corn seed that when planted creates an interspersed refuge within the field.

4) Submit or cite all data required to support MON 89034 x TC1507 plant-incorporated protectant products within the timeframes required by the terms and conditions of EPA Registration Number 68467-2 and 68467-12.

5) To address the potential for resistance development in European Corn Borer (ECB) and Southwestern Corn Borer (SWCB)

• Submit revised modeling incorporating the structural elements recommended by the SAP (explicit larval movement, switch from a frequency-based model to one including density dependent larval mortality, epistatic mechanisms for resistance in target pests), with separate analyses for SWCB and ECB. Mycogen Seeds c/o Dow AgroSciences LLC must include non-uniform oviposition in the modeling for both ECB and SWCB, especially (but not only) for the second generation of adults, which will more likely lay eggs on *Bt* rather than on damaged (or crowded out) non-*Bt* refuge plants in seed blends.

• Submit biological research on adult movement (related to mating and movement from refuges), larval movement, larval feeding (i.e., selective feeding within com ears or on pollen), survival of heterozygote genotypes on MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge (markers may need to be determined for heterozygotes); and the potential for epistatic mechanisms of resistance (particularly with older instars).

To address the potential for resistance development in Corn Earworm (CEW)

• CEW can have up to six generations per year in the southern U.S. and may be at greater risk for resistance in a seed blend environment. Submit CEW modeling for product durability that addresses the following concerns:

a. CEW will encounter a mosaic of *Bt* expression in kernels of refuge corn ear as well as in *Bt* corn ear. Seed blends containing *Bt* and non-*Bt* seeds may actually accelerate resistance in ear-feeding Lepidoptera including corn earworm and fall armyworm. *Bt* ingestion has shown to promote wandering in larvae, and individuals that receive a sublethal dose may move to another kernel. Horner et al. 2003 evaluated feeding patterns of CEW in MON810 and non-*Bt* maize and determined that larvae had greater movement on *Bt* ears and essentially sampled kernels at greater frequency than their counterparts who fed exclusively and in a more compact fashion on non-*Bt* corn ears. This ability to move to another source of kernel in this mosaic of toxins (lethal vs. sublethal) and also to a non-toxin environment will give heterozygous individuals a great fitness advantage: the functional dominance of the resistance allele will increase. (Porter 2011, personal communication)

b. Horner and Dively (2003) found that CEW exposed to Cry1Ab had reduced cannibalistic behavior which, they hypothesize, could serve as a mechanism to increase the selective differential between susceptible and resistant CEW and essentially lead to greater resistance evolution. (Cannibalistic behavior results “in partially

resistant larvae feeding on nontoxic food [their fellow intoxicated larvae], thus temporarily providing escape from exposure to the *Bt* endotoxin.")

c. CEW development on *Bt* corn is delayed (Sims et al. 1996, Storer et al. 2001). This could enable a fraction of adult CEW to mate with CEW emerging from *Bt* cotton. Discretely breeding populations could become continuously breeding for part of the year in this scenario. This may be an important aspect to incorporate into IRM models of the south where corn and cotton are host plants of the same pest. Theoretical explorations are needed to assess effects of this delayed development on corn on the resistance evolution in CEW.

6) Implement the following Insect Resistance Management Program for MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge

a) Refuge Requirements for MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge

The following information must be included on the product bag or bag-tag:

Bag or Bag-Tag for the Corn-Growing Region

This product is a seed mixture containing MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn seed and a minimum of 5% non-*Bt* seed that when planted creates an interspersed refuge within the field. There are no requirements for a separate structured refuge for MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge when planted in the U.S. corn-growing region because the refuge seed is contained within the bag/container. The interspersed refuge can only be used by planting seed corn specifically generated by qualified seed producers/conditioners licensed by the registrant. The seed producer must ensure a minimum of 5% non-PIP refuge seed is included with the MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn seed in each lot of MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge. SEE THE IRM/GROWER GUIDE FOR DETAILED IRM REQUIREMENTS, including the areas making up the corn-growing region.

Bag or Bag-Tag for the Cotton-Growing Region

Growers in the cotton-growing region of the U.S. who plant MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge are required to plant an additional 20% structured refuge (i.e., 20 acres of non-*Bt* corn for every 80 acres of MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge planted). The 20% refuge must be planted with corn hybrids that do not contain *Bt* technologies for corn borers. The refuge and the MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge should be sown on the same day, or with the shortest window possible between planting dates to ensure that corn root development is similar among varieties. The structured refuge may be planted as an in-field or adjacent (e.g., across the road) refuge, or as a separate block that is within 1/2 mile of the MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge field. SEE THE IRM/GROWER GUIDE FOR DETAILED IRM REQUIREMENTS, including the areas making up the cotton-growing region.

The cotton-growing region requiring the additional 20% refuge consists of the following states: Alabama, Arkansas, Georgia, Florida, Louisiana, North Carolina, Mississippi, South Carolina, Oklahoma (only the counties of Beckham, Caddo, Comanche, Custer, Greer, Harmon, Jackson, Kay, Kiowa, Tillman, and

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Washita), Tennessee (only the counties of Carroll, Chester, Crockett, Dyer, Fayette, Franklin, Gibson, Hardeman, Hardin, Haywood, Lake, Lauderdale, Lincoln, Madison, Obion, Rutherford, Shelby, and Tipton), Texas (except the counties of Carson, Dallam, Hansford, Hartley, Hutchinson, Lipscomb, Moore, Ochiltree, Roberts, and Sherman), Virginia (only the counties of Dinwiddie, Franklin City, Greensville, Isle of Wight, Northampton, Southampton, Suffolk City, Surrey, and Sussex) and Missouri (only the counties of Dunklin, New Madrid, Pemiscot, Scott, and Stoddard).

The following information regarding refuge placement for commercial production must be included in the IRM/Grower Guide:

This product includes refuge that is interspersed within the field by planting a licensed seed- mixture containing MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn and a minimum of 5% non-PIP seed. The seed mix refuge option for MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge satisfies the refuge requirements in all regions other than in cotton growing regions where corn earworm is a significant pest as defined below.

The seed producer must ensure a minimum of 5% non-PIP refuge seed is included with the MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn seed in each lot of MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge.

The interspersed refuge can only be used by planting seed corn specifically generated by qualified seed producers/conditioners licensed by the registrant.

Additional refuge requirements in cotton-growing regions where corn earworm is a significant pest

In cotton-growing regions where corn earworm is a significant pest, as defined below, MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge requires the planting of an additional 20% structured refuge (i.e. 20 acres of non-*Bt* corn for every 80 acres of MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge planted).

The 20% refuge must be planted with corn hybrids that do not contain *Bt* technologies for the control of corn borers. The refuge and the MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge should be sown on the same day, or with the shortest window possible between planting dates to ensure that corn root development is similar among varieties. The structured refuge may be planted as an in-field or adjacent (e.g., across the road) refuge, or as a separate block that is within 1/2 mile of the MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge field. In-field refuge options include blocks, perimeter strips (i.e., strips around the field), or in-field strips. If perimeter or in-field strips are implemented, the strips must be at least 4 consecutive rows wide. The refuge can be protected from lepidopteran damage by use of non-*Bt* insecticides if the population of one or more target lepidopteran pests of MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge in the refuge exceeds economic thresholds. Economic thresholds will be determined using methods recommended by local or regional professionals (e.g., Extension Service agents, crop consultants).

The cotton-growing region requiring the additional 20% refuge consists of the following states: Alabama, Arkansas, Georgia, Florida, Louisiana, North Carolina, Mississippi, South Carolina, Oklahoma (only the counties of Beckham, Caddo, Comanche, Custer, Greer, Harmon, Jackson, Kay, Kiowa, Tillman, and Washita), Tennessee (only the counties of Carroll, Chester, Crockett, Dyer, Fayette, Franklin, Gibson, Hardeman, Hardin,

Haywood, Lake, Lauderdale, Lincoln, Madison, Obion, Rutherford, Shelby, and Tipton), Texas (except the counties of Carson, Dallam, Hansford, Hartley, Hutchinson, Lipscomb, Moore, Ochiltree, Roberts, and Sherman), Virginia (only the counties of Dinwiddie, Franklin City, Greensville, Isle of Wight, Northampton, Southampton, Suffolk City, Surrey, and Sussex) and Missouri (only the counties of Dunklin, New Madrid, Pemiscot, Scott, and Stoddard).

b) Grower Agreement for MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge

1) Mycogen Seeds c/o Dow AgroSciences LLC must require that persons purchasing MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge sign a grower agreement. The term "grower agreement" refers to any grower purchase contract, license agreement, or similar legal document.

2) Mycogen Seeds c/o Dow AgroSciences LLC's grower agreement and any specific stewardship documents referenced in the grower agreement must clearly set forth the terms of the current IRM program. Mycogen Seeds c/o Dow AgroSciences LLC must write the grower agreement such that, by signing the grower agreement, a grower must be contractually bound to comply with the requirements of the IRM program.

3) Mycogen Seeds c/o Dow AgroSciences LLC must implement a system (equivalent to that already approved for previously registered Mycogen Seeds c/o Dow AgroSciences LLC *Bt* corn products), which is reasonably likely to assure that persons purchasing MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge will affirm annually that they are contractually bound to comply with the requirements of the IRM program.

4) Mycogen Seeds c/o Dow AgroSciences LLC must continue to use a grower agreement for MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge corn. If Mycogen Seeds c/o Dow AgroSciences LLC wishes to change any part of the grower agreement or any specific stewardship documents referenced in the grower agreement that would affect either the content of the IRM program or the legal enforceability by Mycogen Seeds c/o Dow AgroSciences LLC of the provisions of the agreement relating to the IRM program, Mycogen Seeds c/o Dow AgroSciences LLC must submit to EPA 30 days prior to implementing a proposed change the text of such changes to ensure that it is consistent with the terms and conditions of this registration.

5) Mycogen Seeds c/o Dow AgroSciences LLC shall maintain records of all MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge grower agreements for a period of three years from December 31st of the year in which the agreement was signed.

6) Mycogen Seeds c/o Dow AgroSciences LLC shall make available to the Agency upon request records of the number of units of MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge seed sold or shipped and not returned, and the number of such units that were sold to persons who have signed grower agreements for the previous growing season, within three months of the request.

7) Mycogen Seeds c/o Dow AgroSciences LLC must allow a review of the grower agreements and grower agreement records by EPA or by a State pesticide regulatory agency if the State agency can demonstrate that confidential business information, including names, personal information, and grower license number, will be protected.

c) IRM Education and IRM Compliance Monitoring Program for MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge

- 1) Mycogen Seeds c/o Dow AgroSciences LLC must design and implement a comprehensive, ongoing IRM education program designed to convey to MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge users the importance of complying with the IRM program. The education program shall involve the use of multiple media, e.g. face-to-face meetings, mailing written materials, EPA-reviewed language on IRM requirements on the bag or bag tag, and electronic communications such as by internet, radio, or television commercials. Copies of the materials will be provided to EPA for their records. The program shall involve at least one written communication annually to each MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge corn user separate from the grower technical guide. The communication shall inform the user of the current IRM requirements. Mycogen Seeds c/o Dow AgroSciences LLC shall coordinate its education program with the educational efforts of other registrants and other organizations, such as the National Corn Growers Association and state extension programs.
- 2) Annually, Mycogen Seeds c/o Dow AgroSciences LLC shall revise, and expand as necessary, its education program to take into account the information collected through the compliance survey and from other sources. The changes shall address aspects of grower compliance that are not sufficiently high.
- 3) Within three months of EPA request, Mycogen Seeds c/o Dow AgroSciences LLC shall provide copies of grower education materials and information on grower education activities including any substantive changes to these materials and activities conducted either individually or as part of a report from the industry working group, Agricultural Biotechnology Stewardship Technical Committee (ABSTC).
- 4) Mycogen Seeds c/o Dow AgroSciences LLC will continue to conduct and support grower education (e.g. corn clinics, certified crop advisor training, etc.) that demonstrates the economic and technology-preserving value of crop rotation as a best agronomic practice. Mycogen Seeds c/o Dow AgroSciences LLC will submit to EPA a report with evidence of the 2014 grower education program (specifically including the number of education sessions/trainings held, locations, number of attendees, examples of presentation materials and grower survey results if available) by July 31, 2014. For the following seasons, Mycogen Seeds c/o Dow AgroSciences LLC will submit a similar report upon the request of the agency within three months of the request.

d) Insect Resistance Monitoring and Remedial Action Plans for MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge

Existing programs for resistance monitoring and remedial action for lepidopteran target pests (e.g. European corn borer, corn earworm, southwestern corn borer) for MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn are applicable and required for MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge.

A report on results of resistance monitoring and investigations of damage reports must be submitted to the Agency annually by August 31st each year, beginning in 2014, for the duration of the registration.

e) Annual Reporting Requirements for MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge

Mycogen Seeds c/o Dow AgroSciences LLC must submit to the Agency by the dates specified below, beginning in 2014 (except where otherwise specified), the following information:

(1) Compliance Assurance Program: compliance assurance program activities, including IRM Grower Survey and on-farm assessment results, for the prior year and plans for the compliance assurance program for the current year on or before January 31st of each year;

(2) Insect Resistance Monitoring Results: results of monitoring and investigations of damage reports, by August 31st of each year, beginning in 2014.

f) Refuge Assurance Program for MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge

Mycogen Seeds c/o Dow AgroSciences LLC must continue to implement a blended seed refuge assurance program designed to ensure MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge products are formulated with the appropriate rate of refuge seeds. The program must include the following four elements:

1. Trait purity check on seed lots prior to blending (Mycogen Seeds c/o Dow AgroSciences LLC)
2. Standard Operating Procedures for the blending process;
3. Calibration of blending equipment; and
4. Records and data retention records for seed blend products as follows:

- Calibration records- Mycogen Seeds c/o Dow AgroSciences LLC will retain documentation for three (3) years on the equipment calibration including the procedure, when it was conducted and the results.

- Blend proportion records (weight and kernel based) - Mycogen Seeds c/o Dow AgroSciences LLC will retain documentation for three (3) years on the kernel per pound data of the components, the calculations to determine the proportions based on weight and the actual weights that are blended together to make up a MON 89034 x TC1507 Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge product by seed lot. All records must be maintained at the Mycogen Seeds c/o Dow AgroSciences LLC blending facility and must be available for the EPA review upon request.

Should Mycogen Seeds c/o Dow AgroSciences LLC be notified by the USDA/AMS or State Seed Control Officials that Mycogen Seeds c/o Dow AgroSciences LLC's seed blend products have been found to have a lower percentage of the refuge component than is represented on the label, they must notify EPA within 30 days. This would constitute information reportable under FIFRA section 6(a)(2).

If these conditions are not complied with, the registration will be subject to cancellation in accordance with FIFRA Section 6(e). Your release for shipment of the product constitutes acceptance of these conditions.

A copy of the stamped label is enclosed for your records.

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The basic confidential statement of formula (CSF) dated October 31, 2013, is acceptable and supersedes all previous basic CSFs. A copy has been placed in the file jacket for this registration.

Sincerely,



Robert McNally, Director
Biopesticides and Pollution
Prevention Division (7511P)

Enclosure

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Plant-Incorporated Protectant Label

MON 89034 × TC1507

Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge

(Alternate Brand Name Refuge Advanced™ Powered By PowerCore®) ‡

(OECD Unique Identifier: MON-89034-3 × DAS-01507-1)

Active Ingredients:

Bacillus thuringiensis Cry1A.105 protein and the genetic material (vector PV-ZMIR245) necessary for its production in corn event MON 89034 (OECD Unique Identifier: MON-89034-3) ≤ 0.0026%*

Bacillus thuringiensis Cry2Ab2 protein and the genetic material (vector PV-ZMIR245) necessary for its production in corn event MON 89034 (OECD Unique Identifier: MON-89034-3) ≤ 0.0053%*

Bacillus thuringiensis Cry1F protein and the genetic material (vector PHP8999) necessary for its production in corn event TC1507 (OECD Unique Identifier: DAS- 01507-1) ≤ 0.00122%*

Other Ingredients:

The marker protein, PAT (phosphinothricin acetyl transferase), and the genetic material (vector PHP8999) necessary for its production in corn event TC1507 ≤ 0.00045%*

*Maximum percent (wt/wt) of dry forage

‡ PowerCore® seed with this refuge configuration contains 95% MON 89034 × TC1507 mixed with at least 5% non-*Bt* corn within a single lot of seed.

™Trademark of Dow AgroSciences LLC

KEEP OUT OF REACH OF CHILDREN

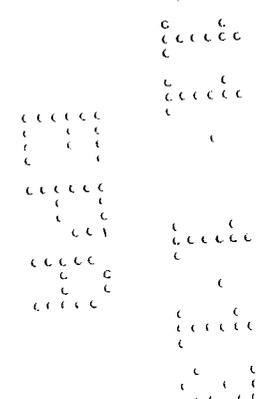
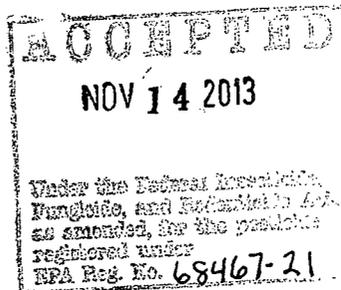
NET CONTENTS _____

CAUTION

EPA Registration No. 68467-ER

EPA Establishment No. 62719-IN-1

Mycogen Seeds c/o Dow AgroSciences LLC
9330 Zionsville Rd.
Indianapolis, IN 46268



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DIRECTIONS FOR USE

It is a violation of Federal law to use this product in any manner inconsistent with its labeling. The plant-incorporated protectant (PIP) product must be used as specified in the terms and conditions of the registration.

This plant-incorporated protectant (PIP) may be combined through conventional breeding with other registered plant-incorporated protectants that are similarly approved for use in combination, through conventional breeding, with other registered plant-incorporated protectants to produce inbred corn lines and hybrid corn varieties with combined pesticidal traits.

Refuge Advanced™ Powered By PowerCore® protects corn crops from leaf, stalk, and ear damage caused by lepidopteran corn pests listed on this label. In order to minimize the risk of these pests developing resistance to Refuge Advanced™ Powered By PowerCore®, an insect resistance management plan must be implemented as defined in the registration terms and conditions.

Grower agreements will specify that growers must adhere to the refuge requirements that will be described in the Product Use Guide for Refuge Advanced™ Powered By PowerCore® or other applicable product use documents.

Sales of corn hybrids that contain Mycogen's Bt corn plant-incorporated pesticide(s) must be accompanied by a Product Use Guide which includes information on planting, production, and insect resistance management and notes that routine applications of insecticides to control these insects are usually unnecessary when corn containing the Bt proteins is planted.

Corn seed bags or bag tags for products containing Refuge Advanced™ Powered By PowerCore® must include the refuge size requirement in text and graphical format.

INSECT RESISTANCE MANAGEMENT

Growers are instructed to read information on insect resistance management.

These refuge requirements do not apply to seed increase/propagation of inbred and hybrid seed corn up to a total of 20,000 acres per county and up to a combined United States (U.S.) total of 250,000 acres per plant-incorporated protectant (PIP) active ingredient per registrant per year.

The following information regarding refuge placement for commercial production must be included in the Product Use Guide.

This product includes refuge that is interspersed within the field by planting a licensed seed-mixture containing MON 89034 × TC1507 and minimum of 5% non-PIP seed. **The seed mix refuge option for Refuge Advanced™ Powered By PowerCore® satisfies the refuge requirements in all regions other than in cotton growing regions where corn earworm is a significant pest as defined below.** The seed producer must ensure a minimum of 5% non-PIP refuge seed is included with the MON 89034 x TC1507 in each lot of seed corn.

The interspersed refuge can only be used by planting seed corn specifically generated by qualified seed producers/conditioners licensed by the registrant.

Additional refuge requirements in cotton-growing regions where corn earworm is a significant pest

In cotton-growing regions where corn earworm is a significant pest, as defined below, the seed-mixture containing MON 89034 × TC1507 and a minimum of 5% non-PIP seed requires the planting of an additional 20% structured refuge (i.e. 20 acres of non-Bt corn for every 80 acres of Refuge Advanced™ Powered By PowerCore® planted).

The 20% refuge must be planted with corn hybrids that do not contain Bt technologies for the control of corn rootworms or corn borers. The refuge and the MON 89034 × TC1507, Insect-Protected, Herbicide-Tolerant Corn

with an Interspersed Refuge should be sown on the same day, or with the shortest window possible between planting dates to ensure that corn root development is similar among varieties. The structured refuge may be planted as an in-field or adjacent (e.g., across the road) refuge, or as a separate block that is within 1/2 mile of the MON 89034 x TC1507, Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge. In-field refuge options include blocks, perimeter strips (i.e., strips around the field), or in-field strips. If perimeter or in-field strips are implemented, the strips must be at least 4 consecutive rows wide. The refuge can be protected from lepidopteran damage by use of non-Bt insecticides if the population of one or more target lepidopteran pests of MON 89034xTC1507 in the refuge exceeds economic thresholds. Economic thresholds will be determined using methods recommended by local or regional professionals (e.g., Extension Service agents, crop consultants).

The cotton-growing region requiring this additional 20% refuge consists of the following states: Alabama, Arkansas, Georgia, Florida, Louisiana, North Carolina, Mississippi, South Carolina, Oklahoma (only the counties of Beckham, Caddo, Comanche, Custer, Greer, Harmon, Jackson, Kay, Kiowa, Tillman, and Washita), Tennessee (only the counties of Carroll, Chester, Crockett, Dyer, Fayette, Franklin, Gibson, Hardeman, Hardin, Haywood, Lake, Lauderdale, Lincoln, Madison, Obion, Rutherford, Shelby, and Tipton), Texas(except the counties of Carson, Dallam, Hansford, Hartley, Hutchinson, Lipscomb, Moore Ochiltree, Roberts, and Sherman), Virginia (only the counties of Dinwiddie, Franklin City, Greensville, Isle of Wight, Northampton, Southampton, Suffolk City, Surrey, and Sussex) and Missouri (only the counties of Dunklin, New Madrid, Pemiscot, Scott, and Stoddard).

The following language will be included on the seed bag tags for MON 89034 x TC1507, Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge

Management Guidelines

This product consists of a licensed seed-mixture/seed-blend containing 95% PowerCore® seed and a minimum of 5% seed that does not contain B.t. technologies for the control of corn borers or corn rootworms. When planted, the refuge will be interspersed within the field.

The interspersed refuge configuration in Refuge Advanced™ Powered By PowerCore® fulfills the grower's refuge requirements for this product in non-cotton growing regions and in cotton growing regions where corn earworm is not a significant pest.

The interspersed refuge in Refuge Advanced™ Powered By PowerCore® is not sufficient to meet IRM requirements in cotton growing regions where corn earworm is a significant pest. In these regions growers are required to plant a structured 20% corn refuge for corn earworm.

In the cotton-growing regions where corn earworm is a significant pest, the structured refuge may be planted as an in-field or adjacent (e.g., across the road) refuge or as a separate block that is within 1/2 mile of the MON 89034 x TC1507, Insect-Protected, Herbicide-Tolerant Corn with an Interspersed Refuge field. In-field refuge options include blocks, perimeter strips (i.e., strips around the field) or in-field strips. If perimeter strips or in-field strips are implemented, the strips must be at least four consecutive rows of corn wide.

Cotton Growing Region

The cotton-growing region requiring this additional 20% refuge consists of the following states: Alabama, Arkansas, Georgia, Florida, Louisiana, North Carolina, Mississippi, South Carolina, Oklahoma (only the counties of Beckham, Caddo, Comanche, Custer, Greer, Harmon, Jackson, Kay, Kiowa, Tillman, and Washita), Tennessee (only the counties of Carroll, Chester, Crockett, Dyer, Fayette, Franklin, Gibson, Hardeman, Hardin, Haywood, Lake, Lauderdale, Lincoln, Madison, Obion, Rutherford, Shelby, and Tipton), Texas (except the counties of Carson, Dallam, Hansford, Hartley, Hutchinson, Lipscomb, Moore, Ochiltree, Roberts, and Sherman), Virginia (only the counties of Dinwiddie, Franklin City, Greensville, Isle of Wight, Northampton, Southampton, Suffolk City, Surrey, and Sussex) and Missouri (only the counties of Dunklin, New Madrid, Pemiscot, Scott, and Stoddard)

Corn Insects Controlled or Suppressed

European corn borer (ECB)	<i>Ostrinia nubilalis</i>
Southwestern corn borer (SWCB)	<i>Diatraea grandiosella</i>
Southern cornstalk borer (SCSB)	<i>Diatraea crambidoides</i>
Corn earworm (CEW)	<i>Helicoverpa zea</i>
Fall armyworm (FAW)	<i>Spodoptera frugiperda</i>
Stalk borer	<i>Papaipema nebris</i>
Lesser corn stalk borer	<i>Elasmopalpus lignosellus</i>
Sugarcane borer (SCB)	<i>Diatraea saccharalis</i>
Western bean cutworm (WBC)	<i>Richia albicosta</i>
Black cutworm	<i>Agrotis ipsilon</i>

Refuge Advanced™ Powered By PowerCore® is a product of Monsanto's and Dow AgroSciences' research programs, offering unique genetic characteristics for specific grower needs and may be protected by one or more of the following U.S. patents:

DAS Patent Rights: 5,510,474; 6,218,188, and 6,943,282

Monsanto Patent Rights: 5,554,798; 5,593,874; 5,641,876; 5,717,084; 5,728,925; 5,859,347, 6,025,545; 6,051,753; 6,083,878; 6,489,542; 6,645,497; 6,713,063; 6,825,400; 6,962,705; 7,064,249; 7,070,982; 7,112,665; 7,250,501; 7,304,206; 7,582,434; 7,618,942; 7,700,830; 7,927,598; 8,034,997; 8,273,959 and RE39247

